

Chapter 2

Alternatives, Including the Proposed Action

2.1 Introduction

This Chapter describes the alternatives developed to address the issues, presents a comparison of the alternative features and a summary of the impacts that would result from implementing each alternative. Section 2.3 presents the alternatives in detail.

2.2 Development of Alternatives

Alternatives present different management options to address the relevant major issues listed in Section 1.5 associated with the proposed action. The impact analysis then describes the known or potential impacts that would result from each alternative. Alternatives developed for this EA include, the No Action Alternative, which provides a baseline for comparison of what would occur if there was no BLM approval, the proposed Fidelity Plan of Development and a third alternative that looks at the impact of Fidelity's proposal and includes additional mitigation measures in order to reduce the impacts of the proposed action.

2.2.1 Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives were considered during alternative development but eliminated from detailed analysis either because they did not satisfy the purpose and need for the proposed action, did not address the issue(s), or were not feasible.

Phased Development Alternative

In this suggested alternative, development would be required to be phased-in and the number of producing wells at any given time would be limited. Basin wide phased development was considered during the MT EIS process. It was determined that this alternative was not reasonable and therefore was dropped from consideration (MT EIS, page 2-4). However, phased development is actually occurring as individual development proposals are analyzed. Impacts to resources, such as surface water quality and wildlife habitat from past and reasonably foreseeable development, are considered during the analysis. As individual development proposals are approved and development occurs, resource condition monitoring is conducted. The purpose of the monitoring is to evaluate the effectiveness of mitigation measures, determine the need of existing or additional mitigation measures, ensure desired results are achieved and assess conditions and trends. The results of the monitoring are used in the development of the mitigation measures to be utilized on future projects. Therefore, the benefits from phased development are already being achieved.

Water Re-Injection into Depleted Coal Zones Alternative

In this suggested alternative, gas production would occur from only one coal seam at a time. After depletion of gas in the coal seam, gas production would come from another coal seam and so on until all economical coals have been produced. After completion of production from the first coal seam, produced water from the next coal seam would be injected into the coal seam that had been depleted. This would reduce the amount of produced water requiring surface disposal.

This method of water disposal is not feasible at the present time. The physical characteristics of the coals are much different than sands and sandstone formations which are typically used for disposal. The coals have almost no void space into which water could be placed unlike some sandstone formations. The coals would have a tendency to break under the pressure of injection, again unlike many sandstone formations.

Water Treatment Alternative

This suggested method of managing produced water would require all produced water to be “treated” so that the water quality of receiving waters, soils and vegetation and existing beneficial uses would be protected. The quality of produced water varies from one coal to another and even geographically within a coal. Not all produced water needs to be “treated” before being discharged directly into a body of water or before being used in a beneficial manner. The end use of the produced water and the authorizing permit determine the need for “treatment.” The analysis in this EA shows no unresolved conflicts concerning the management of produced water, therefore, an analysis of a separate water treatment alternative is not necessary to address water quality issues.

Road Reclamation Alternative

This method of addressing the final condition of access roads was suggested in order to satisfy landowner concerns with road-related disturbances. The alternative suggested is that these roads either be reclaimed or maintained at the discretion of the surface owner. However, this reclamation requirement is already a part of current practices on federal leases. Road reclamation in accordance with the surface owner’s requirements is part of the project proposal and is consistent with the requirements in the Montana Statewide MT EIS (ROD, page 6). A separate alternative is not needed to address this issue.

2.3 Description of the Alternatives

Alternative A, the No Action Alternative, represents a continuation of the existing situation where BLM would not approve Fidelity’s proposed POD. However, state and private development are assumed to proceed in the project area as they do not require BLM authorization. Alternative B consists of the proposed Project plan submitted by Fidelity on both the federal minerals and the private and state CBNG development. Alternative C, the Preferred Alternative, consists of Fidelity’s proposal under Alternative B with additional mitigation measures developed by BLM. A detailed description of the three alternatives follows.

2.3.1 Alternative A—State and Private Development Only (No Action)

In this Alternative there would not be any BLM approval action and none of the federal wells in the POD would be drilled, completed or produced; nor would any of the associated infrastructures that required BLM approval be installed or constructed in the Project area. However, private and state actions would continue to develop the CBNG resources in the Project area.

Drilling

While there would not be any federal wells drilled, it is anticipated that the operator would drill the 20 state and 72 private wells in the Plan of Development. All wells capable of commercial production would be completed and produced and the associated infrastructure would be constructed and installed. Wells would be located on 160 acre well spacing (one well per coal seam per 160 acres). Separate vertical wells would be drilled into the Carney, Monarch and Dietz coal seams. In some areas, the Dietz splits into as many as three zones. Anticipated depth of the wells would be from 100 to 1,000 feet deep.

Wells would be drilled by truck-mounted water well-type drilling rigs. The wells would be drilled using air and water for circulation and supplemented as needed by bentonite and sawdust or wood chips. Steel casing would be cemented in place from ground surface to the top of the target coal seam. The casing would be sized to accommodate a downhole pump to lift water, but would typically be seven inches in diameter. The well would then be drilled to the base of the target coal seam and under reamed to increase the exposed coal surface for production. Fresh water, including coal seam water, would be used in the drilling operations.

Drilling wastes including cuttings, water and drilling muds would be placed in two pits. Each pit would be approximately 6-feet wide, by 15-feet long, by 15-feet deep and fenced with a wire fence to keep out livestock and wildlife. After conclusion of drilling operations, fluids in the pits would be removed and either used for other drilling operations or disposed of properly and the pits backfilled after the remaining muds have dried. Wastes accumulated during drilling and completion operations would be contained on the well site and disposed at the Sheridan sanitary landfill. Chemical “porta-potties” would be located at active construction, drilling and battery sites.

Access

Vehicles would access the well sites by existing bladed roads, up to 14 miles of two track trails or across undisturbed rangeland along a designated route. Pipeline corridors would also be used as temporary roads for access to well sites. Culverts would be installed at drainage crossings, if needed. Gravel or scoria needed for surfacing material would come from a pit owned and operated by Fidelity and permitted by MDEQ.

Approximately 3.4 miles of existing roads would be upgraded to all weather conditions. This upgrade would include gravel or scoria surfacing material from a pit owned and operated by Fidelity and permitted by MDEQ. Signs would be installed with posted speed limits in and adjacent to mountain plover habitat, sage grouse leks and brood rearing habitats.

Well Sites

The 20 state wells would be drilled at 4 sites with 5 wells being drilled at each site and the 72 private wells would be drilled at 18 sites with up to 5 wells being drilled at each site. The proposed state well sites are located on surface and minerals owned by the State of Montana and the proposed private wells are located on privately owned surface and minerals. Approximately 1 acre at each well site would be disturbed by vehicle traffic, drilling and completion operations, reserve pits and temporary storage of equipment. Most of the well sites would not require construction of a well pad. If construction is needed, it would consist of blading a level area for the drill rig.

Surface facilities at each producing well would consist of a wellhead and an insulated, fiberglass well head cover (approximately 5-feet square by 4-feet tall) and an electrical panel all enclosed in a three rail welded fence. The cover would be painted a color to blend with the surrounding area. The area within the fence would be graveled while the area outside the fence would be reclaimed after installation of production equipment.

Flowlines

A plastic flowline to carry gas would be buried from each well to a battery site. Approximately 9 miles of this line would be combined with water flowlines in the same trench. One plastic flowline would be buried to carry produced water from all wells at the well site to a designated storage site or discharge point. When feasible, flowline routes would parallel and be located adjacent to existing or proposed roads and trails, although some flowlines (approximately 3.5 miles of water line) would follow the most direct route to the battery or water storage/discharge point. One electrical cable would be buried parallel to the access road or following the most direct route from a power pole to the well site. Areas disturbed for flowline installation would be reclaimed.

Battery Sites

One existing field battery (Conner 33 Battery) would be used to process gas from the private wells. In addition, three new battery sites would be constructed in an area approximately 2 acres in size and enclosed with a barbed wire fence. One or two meter houses and up to two compressors would be located at one of the batteries (Montana State 36) and up to three compressors at the other two batteries (Seven Brothers 35 and Consol 27 Batteries). Additional compressors, up to a total of six, are planned at all of

these battery sites for future development activity. Meter houses and compressor buildings would be painted to blend in with the surrounding area. Access roads to battery sites would be crowned, ditched and surfaced with gravel. The Symons Central Compressor Station (six 1,680 horsepower (hp) Waukesha compressor engines, two 840 hp compressor engines and two glycol dehydration units) would be used to boost the pressure of all produced gas to enable transmission to sale markets.

Power Lines

Electricity would be provided to each battery site by a buried cable or an aerial line. Electricity would be brought into the Project area by 5.5 miles of aerial lines from existing lines north and south of the Project area. Aerial power lines would be installed parallel to an access road or following the most direct route into a subsection of the Project area. Approximately 8 miles of buried electrical cables would tie into the aerial power lines at a service tap which typically would serve up to three wells.

Produced Water

Water produced with CBNG would be made available for beneficial uses or discharged into the Tongue River in accordance with Fidelity's existing MPDES permit. Produced water would be transported through buried plastic flowlines from each well site to: (a) 4 discharge points (outfalls) along the Tongue River, (b) 2 off-channel, total containment stock water reservoirs, (c) 2 off-channel, total containment storage reservoirs for irrigation, (d) 7 stock watering tanks or (e) 2 coal mines.

Discharge points (a) into the Tongue River would be located near the main channel in areas with low channel gradients. Each outfall structure would consist of a riprap pad surrounding the discharge pipe with a narrow riprap lined trench sloping into the channel area to prevent eroding the channel bank.

Reservoirs (b, c) would be located in a natural depression that captures water but is not a wetland and created by construction of an earthen dam and excavation of soil above the dam. A key way would be excavated along the centerline of the dam and then backfilled with compacted clay soil. The dam would also be constructed with clay soil in compacted lifts. Low permeability clay would be placed in the bottom and sides of each reservoir. An emergency spillway designed to accommodate runoff from a 100-year storm event in 24 hours would be constructed adjacent to the dam. The buried flowline bringing water into the reservoir would be installed to discharge water in the middle of the reservoir.

Some of the produced water would be used to irrigate (c) native vegetation in the valley bottom of a portion of Badger Creek and on a plateau above Badger Creek. Agricultural amendments would be added either to the soil or to the produced water as a result of soils and water analyses. Managed irrigation would follow the protocol developed by KC Harvey, Inc. for Fidelity and would be conducted under a contractual agreement with the surface owner and accomplished by either center pivot or solid set irrigation systems. Some of the produced water would be transported in buried flowlines to stock watering tanks on private surface (d). Some of the produced water would be transported in buried flowlines to the Decker and Spring Creek coal mines for industrial uses (e).

Reclamation

Reclamation would occur in areas where surface disturbing activities have been completed or concurrently while other operations are occurring in the Project area. Reclamation activities would be conducted in accordance with agency requirements and surface owner agreements. Typically, disturbed areas not needed for production operations would be recontoured to resemble the surrounding terrain, stored topsoil would be spread over the recontoured area, necessary erosion control measures would be installed, disturbed areas would be seeded with a certified seed mix agreed upon with the surface owner and reclamation work would be completed within 1 year after a specific activity has been completed. Final reclamation would be completed approximately 2 to 3 years following the end of gas production.

2.3.2 Alternative B—Fidelity Plan of Development (Proposed Action)

This alternative consists of Fidelity's proposed Plan of Development (POD), which includes Master Drilling and Surface Use Plans, a Water Management Plan, a Cultural Resource Inventory Plan, a Wildlife Monitoring and Protection Plan, and other supporting information. The POD describes the Project and best management practices, including mitigation measures, designed to implement the Project. The analysis of the proposed Project includes all of the private (72) and state (20) wells and infrastructure, plus the proposed federal wells (85) and infrastructure in order to evaluate a complete picture of the activity that would occur in the project area. However, the only authorization that would be issued by BLM under this Alternative would be for the federal wells and facilities on federal leases for the development and production of such federal wells.

The federal oil and gas lease covering the S½ SE¼ of Section 21, T. 9 S., R. 40 E. includes a No Surface Occupancy stipulation for lands within an approved coal mine permit. A review of BLM records shows that this area is south of the mine permit boundary and therefore, BLM has granted a "modification" to the lease which allows Fidelity to propose two federal well sites in this area.

The wells would be located on 160 acre well spacing (one well per coal seam per 160 acres). The proposed 85 federal wells would be drilled and all wells, including 1 previously drilled federal well capable of commercial production, would be completed and produced. Separate vertical wells would be drilled into the Carney, Monarch and Dietz coal seams. In some areas, the Dietz splits into as many as three zones. Anticipated depth of the wells would be from 100 to 1,000 feet deep. Land and mineral status are shown on Map 3.4-1.

Drilling

Wells would be drilled by truck-mounted water well drilling rigs. The wells would be drilled using air and water for circulation and supplemented as needed by bentonite and sawdust or wood chips. Steel casing would be cemented in place from ground surface to the top of the target coal seam. The casing would be sized to accommodate a downhole pump to lift water, but would typically be seven inches in diameter. The well would then be drilled to the base of the target coal and under reamed to increase the exposed coal surface for production. Fresh water, including coal seam water, would be used in the drilling operations.

Drilling wastes including cuttings, water and drilling muds would be placed in two pits. Each pit would be approximately 6-feet wide, by 15-feet long, by 15-feet deep and fenced with a wire fence to keep out livestock and wildlife. After conclusion of drilling operations, fluids in the pits would be removed and either used for other drilling operations or disposed of properly and the pits backfilled after the remaining muds have dried. Wastes accumulated during drilling and completion operations would be contained on the well site and disposed at the Sheridan sanitary landfill. Chemical "porta-potties" would be located at active construction, drilling and battery sites.

Access

Vehicles would access the well sites by existing bladed roads, two track trails or across undisturbed range land along a designated route. Pipeline corridors would also be used as temporary roads for access to well sites. Culverts would be installed at drainage crossings if needed. Approximately 4.4 miles of existing roads would be upgraded to all weather conditions. This upgrade would include gravel or scoria surfacing material from a pit owned and operated by Fidelity and permitted by MDEQ. Signs would be installed with posted speed limits in and adjacent to mountain plover habitat, sage grouse leks and brood rearing habitats.

Well Sites

The 20 state wells would be drilled at 4 sites with 5 wells being drilled at each site and the 72 private wells would be drilled at 18 sites with up to 5 wells being drilled at each site. The proposed state well sites are located on surface and minerals owned by the State of Montana and the proposed private wells are located on privately owned surface and minerals.

The 85 federal wells would be drilled at 18 sites with up to 5 wells being drilled on each site and 1 previously drilled well on a separate site being placed on production. The proposed well sites are located on privately owned surface over federal minerals. Approximately 1 acre at each well site would be disturbed by vehicle traffic, drilling and completion operations, reserve pits and temporary storage of equipment. Most of the well sites would not require construction of a well pad. If construction is needed, it would consist of blading a level area for the drill rig.

This alternative includes the relocation of the Federal 12-3590 and Federal 13-3091 well sites and access roads to reduce impacts to mule deer winter range and the relocation of the Federal 34-3191 access road to reduce surface disturbance. These actions were discussed and agreed to by Fidelity and BLM during the BLM pre-drill inspections and therefore, are part of Fidelity's POD.

Surface facilities at each producing well would consist of a wellhead and an insulated, fiberglass well head cover (approximately 5-feet square by 4-feet tall) and an electrical panel all enclosed in a three rail welded fence. The cover would be painted a color to blend with the surrounding area. The area within the fence would be graveled while the area outside the fence would be reclaimed.

Flowlines

A plastic flowline to carry gas would be buried from each well to a battery site. Approximately 17 miles of multiple flowlines would be placed in the same trench. One plastic flowline would be buried to carry produced water from all wells at a well site to a designated storage site or discharge point. When feasible, flowline routes would be parallel and be located adjacent to existing or proposed roads and trails, although some flowlines, approximately 3.5 miles of water line and one mile of 8 to 12 inch steel gas line, would follow the most direct route to the battery or water storage/discharge point. One electrical cable would be buried parallel to the access road or following the most direct route from a power pole to the well site. Areas disturbed for flowline installation would be reclaimed.

A right-of-way would be required for five three-inch buried poly gas lines, one buried three-inch water line and one plowed in 3-phase, 75 KV, powerline in the NE $\frac{1}{4}$ SW $\frac{1}{4}$, Section 26, T. 9 S., R. 40 E. The right-of-way would be 900 feet long, 30 feet wide and consist of .62 acres, more or less. The gas and water lines would be in one 22 inches to 36 inches wide five-foot deep trench and the powerline would be plowed in 24 inches deep alongside and 15 feet from the pipeline trench with a 6 inch disturbed area, for a total disturbed area of .072 acre. The right-of-way would be granted under Section 28 of the Mineral Leasing Act of 1920, as amended (MLA) and the pipelines and power line would be constructed, used, maintained and terminated in conformance with the company's plan of development.

Battery Sites

One existing field battery (Conner 33 Battery) would be used to process gas from private wells. In addition, four new battery sites would be approximately 2 acres in size and enclosed with a barbed wire fence. One or two meter houses and up to two compressors would be located at two of the batteries (Montana State 36 and Visborg 25 Batteries) and up to three compressors at the other two batteries (Seven Brothers 35 and Consol 27 Batteries). Additional compressors, up to a total of six, are planned at all of these battery sites for future development activity. Meter houses and compressor buildings would be painted to blend in with the surrounding area. Access roads to battery sites would be crowned, ditched and surfaced with gravel. The Symons Central Compressor Station (six 1,680 horsepower (hp) Waukesha

compressor engines, two 840 hp compressor engines and two glycol dehydration units) would be used to boost the pressure of all produced gas to enable transmission to sale markets.

Power Lines

Electricity would be provided to each battery site by a buried cable or an aerial line. Electricity would be brought into the Project area by 8 miles of aerial lines from existing lines north and south of the Project area. Aerial power lines would be installed parallel to an access road or following the most direct route into a subsection of the Project area. Approximately 13.5 miles of buried electrical cables would tie into the aerial power lines at a service tap which typically would serve up to three wells. Aerial power lines would be constructed to comply with the avian standard mitigation measures prescribed in the MT EIS, Vol. II, Wildlife Appendix.

Produced Water

Water produced with CBNG would be made available for beneficial uses or discharged into the Tongue River in accordance with Fidelity's existing MPDES permit. Produced water would be transported through buried plastic flowlines from each well site to: (a) 4 discharge points (outfalls) along the Tongue River, (b) 2 off-channel, total containment stock water reservoirs, (c) 2 off-channel, total containment storage reservoirs for irrigation, (d) 7 stock watering tanks or (e) 2 coal mines.

Discharge points (a) into the Tongue River would be located near the main channel in areas with low channel gradients. Each outfall structure would consist of a riprap pad surrounding the discharge pipe with a narrow riprap lined trench sloping into the channel area to prevent eroding the channel bank.

Reservoirs (b, c) would be located in a natural depression that captures water but is not a wetland and created by construction of an earthen dam and excavation of soil above the dam. A key way would be excavated along the centerline of the dam and then backfilled with compacted clay soil. The dam would also be constructed with clay soil in compacted lifts. Low permeability clay would be placed in the bottom and sides of each reservoir. An emergency spillway designed to accommodate runoff from a 100 year storm event in 24 hours would be constructed adjacent to the dam. The buried flowline bringing water into the reservoir would be installed to discharge water in the middle of the reservoir.

Some of the produced water would be used to irrigate (c) native vegetation in the valley bottom of a portion of Badger Creek and on a plateau above Badger Creek. Agricultural amendments would be added either to the soil or to the produced water as a result of soils and water analyses. Managed irrigation would follow the protocol developed by KC Harvey, Inc. for Fidelity and would be conducted under a contractual agreement with the surface owner and accomplished by either center pivot or solid set irrigation systems. Some of the produced water would be transported in buried flowlines to stock watering tanks on private surface (d). Some of the produced water would be transported in buried flowlines to the Decker and Spring Creek coal mines for industrial uses (e).

Reclamation

Reclamation would occur in areas where surface disturbing activities have been completed or concurrently while other operations are occurring in the Project area. Reclamation activities would be conducted in accordance with agency requirements and surface owner agreements. Typically, disturbed areas not needed for production operations would be recontoured to resemble the surrounding terrain, stored topsoil would be spread over the recontoured area, necessary erosion control measures would be installed, disturbed areas would be seeded with a certified seed mix agreed to with the surface owner and reclamation work would be completed within 1 year after a specific activity has been completed. Final reclamation would be completed approximately 2 to 3 years following the end of gas production.

2.3.3 Alternative C—Fidelity Plan of Development with Additional Mitigation

This alternative includes all the actions, requirements and resource protection measures contained in the operator's proposal under Alternative B, plus the following additional mitigating measures in the following categories. These mitigating measures would apply to the federal wells, facilities on federal leases for the development and production of such federal wells and facilities completed solely for the development and production of federal wells. Additional measures would either be attached to drilling permits as conditions of approval that would need to be implemented by Fidelity or they would be measures completed by BLM. As a result of inspections or monitoring, BLM can impose necessary mitigation measures that were not previously identified or rescind mitigation measures that are not necessary.

General

1. The first well drilled to each targeted coal zone will be designated as the POD reference well. Designated reference wells must have the ability to be sampled at the wellhead. Water quality samples must be collected by the operator and submitted for analysis using MDEQ NPDES criteria within 60 days of initial water production. Results of the analysis must be submitted to the MCFO-BLM Authorized Officer as soon as they become available.
2. A pre-construction field meeting must be conducted prior to beginning any construction activities approved under this POD. The operator must contact the BLM Authorized Officer, (406-233-3647) at least 4 days prior to beginning operations so that the meeting can be scheduled. The operator is responsible for having all contractors present (dirt contractors, drilling contractor, pipeline contractor, project oversight personnel, etc.) including the overall field operations superintendent, and for providing all contractors copies of the approved POD, project map and BLM Conditions of Approval pertinent to the work that each would be doing.
3. The operator must submit a Sundry Notice (Form 3160-5) to BLM for approval prior to construction of any new surface disturbing activities related to federal leases that are not specifically addressed in the approved APD or POD Surface Use Plan.
4. If any cultural values (sites, artifacts, human remains, etc.) are observed during operation of this lease/permit/right-of-way, they are to be left intact and the Miles City Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials and contact the authorized BLM officer. Within five working days, the AO will inform the operator as to:
 - ☐ Whether the materials appear eligible for the National Register of Historic Places;
 - ☐ The mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
 - ☐ A time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

5. If paleontological resources, either large or conspicuous and/or a significant scientific value are discovered during construction, the find must be reported to the Authorized Officer immediately. Construction must be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological values. Operations within 250 feet of such a discovery must not be resumed until written authorization to proceed is issued by the Authorized Officer. The applicant must bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operation.
6. Prior to the use of pesticides on public land, the holder must obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers and any other information deemed necessary by the authorized officer to such use. Disturbed areas must be monitored annually for the presence of noxious weeds from June through August. Monitoring must begin prior to disturbance.
7. Fidelity employees and subcontractors will be prohibited from possessing firearms on the project.

Drilling

1. A diverter must be installed to control uphole pressures. (BOP equipment is not required)
2. All wait on cement times must be sufficient for the cement to reach 500 psi compressive strength as required by Onshore Oil & Gas Order No. 2.III.B.
3. A minimum of three centralizers must be installed on the production casing and spaced to afford maximum protection of the shallow coals and aquifers.
4. Reserve pits must be adequately fenced during and after drilling operations until pit is reclaimed to effectively keep out wildlife and livestock. Adequate fencing, in lieu of more stringent requirements by the surface owner, is defined as follows:
 - ☐ Construction materials must consist of steel or wood posts. Three or four strand wire (smooth or barbed) fence or hog panel (16-foot length by 50-inch height) or plastic snow fence must be used with connectors such as fence staples, quick-connect clips, hog rings, hose clamps, twisted wire, etc.
 - ☐ Construction standards: Posts must be firmly set in ground. If wire is used, it must be taut and evenly spaced, from ground level to top wire, to effectively keep out animals. Hog panels must be tied securely into posts and one another using fence staples, clamps, etc. Plastic snow fencing must be taut and sturdy. Fence must be at least 2 feet from edge of pit, three sides fenced before beginning drilling, the fourth side fenced immediately upon completion of drilling and prior to rig release. Fence must be left up and maintained in adequate condition until pit is closed.
5. The reserve pit must be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having a permeability less than 10⁻⁷ cm/sec. The liner must be installed so that it will not leak and must be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material must be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand must be used prior to installing the liner.

6. The reserve pit must be constructed so that at least half of its total volume is below natural ground level.
 7. The operator must complete federal CBNG wells (case, cement and under ream) as soon as possible, but no later than 30 days after drilling operations, unless an extension is given by the BLM AO.
 8. All waste, other than human waste and drilling fluids, must be contained in a portable trash container and transported to a State approved waste disposal site immediately upon completion of drilling operations. No trash or empty barrels may be placed in the reserve pit or buried on location. All state and local laws and regulations pertaining to disposal of human and solid waste must be complied with.
 9. Rat and mouse holes must be filled and compacted from the bottom to the top immediately upon release of the drilling rig from the location. The only fluids/waste materials which are authorized to go into the reserve pit are Resource Conservation and Recovery Act (RCRA) exempt exploration and production wastes. These include:
 - drilling muds & cuttings
 - rigwash
 - excess cement and certain completion & stimulation fluids defined by EPA as exempt
- It does not include drilling rig waste, such as:
- spent hydraulic fluids
 - used engine oil
 - used oil filter
 - empty cement, drilling mud, or other product sacks
 - empty paint, pipe dope, chemical or other product containers
 - excess chemicals or chemical rinsate
10. Any evidence of non-exempt wastes being put into the reserve pit may result in the BLM Authorized Officer requiring specific testing and closure requirements.
 11. Any materials classified as nonexempt hazardous wastes must be disposed of in an EPA approved facility.
 12. If these wells are drilled during the fire season (June-October), the operator must take all necessary precautions to ensure that fire hazard is minimized, including but not limited to mowing vegetation on the access routes and well sites and keeping fire fighting equipment readily available when drilling.

Access

1. Access roads, including drainage control, must be improved and maintained as necessary or as directed by the BLM Authorized Officer to prevent soil erosion and to provide for safe and environmentally-sound access.
2. Vehicle travel on unimproved two-track roads is prohibited during periods of inclement weather or spring thaw when the possibility exists for excessive surface resource damage such as creating ruts in excess of 4 inches or causing vehicles to travel outside two-track roadway. This applies to pre-approval APD/POD vehicle travel such as for surveying and staking, drilling, production operations.
3. Culverts must be placed on channel bottoms on firm, uniform beds, which have been shaped to accept them and aligned parallel to the channel to minimize erosion. Backfill material must be thoroughly

compacted. All culverts must be appropriately sized in accordance with standards in BLM Manual 9113.

4. Construction and other project-related traffic is restricted to approved routes. Cross-country vehicle travel is not allowed.
5. Maximum design speed on all operator constructed and maintained roads must not exceed 25 miles per hour.
6. Water or other non-saline dust suppressants with at least 50 percent control efficiency must be applied during well site, battery site and road construction. Dust inhibitors (surfacing materials, non-saline dust suppressants and water) must be used as necessary on unpaved roads that present a fugitive dust problem. The use of chemical dust suppressants on public surface will require prior approval from the BLM Authorized Officer.
7. The operator must establish, post and enforce speed limits to achieve at least a 65% reduction of fugitive dust emissions from an assumed base speed equal to 40 miles per hour. The operator must administer dust control measures on active access roads, well sites and battery sites.

Well Sites

1. Production facilities (including dikes) must be placed on the cut portion of the location at a minimum of 15 feet from the toe of the back cut unless otherwise approved by the BLM Authorized Officer.
2. Equipment must not be stored on the topsoil stockpiles.
3. A minimum 20-foot undisturbed vegetative border must be maintained between toe-of-fill of pad and/or pit areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.

Flowlines

1. Pipeline trenches must be compacted during backfilling and must be routinely inspected and maintained to ensure proper stabilization and reclamation.
2. Pipeline construction must not block nor change the natural course of any drainage. Pipelines must cross perpendicular to drainages. Pipelines must not be run parallel in drainage bottoms.

Battery Sites

1. Contact Montana Department of Environmental Quality to determine permit requirements before installation of production equipment that has the potential to emit air contaminants. Examples of pertinent well production equipment include fuel-fired equipment (e.g., diesel generators), separators, storage tanks, engines and dehydrators.
2. If these facilities are installed during the fire season (June-October), the operator must take all necessary precautions to ensure that fire hazard is minimized, including but not limited to mowing vegetation on the access route(s) and well location(s), keeping fire fighting equipment readily available when drilling, etc.
3. Production facilities (including dikes) must be placed on the cut portion of the location at a minimum of 15 feet from the toe of the back cut unless otherwise approved by the BLM Authorized Officer.

Produced Water

1. The Operator will install 2 monitoring wells within 50 feet of each impoundment. One well will be installed on each side of the impoundment. These wells will be screened from the lowest elevation in the impoundment to the anticipated high water mark. This is to monitor the effectiveness of the clay lining. These impoundments all have natural clay bottoms, therefore, deeper monitoring is not needed. It is not anticipated that these wells will contain any water initially. These wells will be gauged monthly and reported to the BLM authorized officer annually unless water levels change by 1 foot or more, or if water is detected in a previously dry well. If such changes are observed, the BLM authorized officer must be notified within 5 business days and a cause analysis conducted. If adverse monitoring results are recorded, discharge into these impoundments may need to be stopped, the water removed and repairs conducted, prior to the reintroduction of produced water to these impoundments. Monitoring of these wells will continue for the life of the impoundment.
2. The effluent limitations, other conditions and self-monitoring requirements must be met as contained in Section I.B of MDEQ's DRAFT General Discharge Permit Coal Bed Methane Produced Water (see Appendix E of the Badger Hills Hydrology Technical Report). All reporting will be as described in the DRAFT General Discharge Permit, except that reports will be submitted to the BLM rather than to the MDEQ. If adverse monitoring results are recorded, discharge into these impoundments may need to be stopped until a modified Water Management Plan (WMP) which addresses the problem is developed and approved. If the impoundments are removed, the land must be returned to its previous utility and stability.
3. The operator will install one monitoring well approximately 300 feet topographically up-gradient and one monitoring well approximately 300 feet topographically down-gradient from the land application area along Badger Creek. These wells will be screened from 5 feet above to 10 feet below the existing alluvial groundwater table. One monitoring well will also be installed near the irrigation areas on the benches above Badger Creek, between the irrigation areas and the slope leading down to Badger Creek. These wells will be finished above the first major aquatard (shale > 1 ft thick) and shall not be greater than 25 feet in depth. Gauging and sampling of these wells will be conducted quarterly and reported to the BLM authorized officer annually until land application activities cease. Analysis will include EC, TDS, pH and major ions (Na, Ca, Mg, K, HCO₃, SO₄ and Cl). If changes in groundwater levels of greater than 1 foot above baseline conditions (determined prior to initiation of irrigation) are recorded, if water is detected in a previously dry well, if EC increases by greater than 200 µS/cm above baseline EC, if the pH changes by 1 unit, or if the concentration of any other parameter changes by 20% or more, the BLM authorized officer must be notified within 5 business days and a cause analysis conducted. Adverse monitoring results may require the cessation of land application until a revised WMP which addresses the problem is developed and approved.
4. The operator must monitor the managed irrigation sites for soils and vegetation productivity after irrigation with produced water ceases for a year or until monitoring indicates that the impacts of the irrigation have been mitigated, whichever is sooner. Monitoring and data collection will follow the Protocol for Evaluating, Designing, Operating, and Monitoring Managed Irrigation Systems for Coal Bed Natural Gas Produced Water: Tongue River – Badger Hills Project, Bighorn County, Montana (summarized in Appendix 2). Monitoring data must be made available to BLM and the surface owner.

Reclamation

1. Reclamation plans must be submitted to BLM for approval via a Notice of Intent (NOI) Sundry Notice before abandoning individual federal POD facilities. Any deviation from the Surface Reclamation Plan included in the Badger Hills POD must be included at this time. Individual

facilities include well locations, pipelines, impoundments, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities and batteries.

2. Pit reclamation:
 - a. All pit(s) must be emptied of all fluids within 90 days after completion of drilling operations. The pit must be closed properly to assure protection of soil, water and vegetation.
 - b. The pit may not be cut or trenched.
 - c. Pit mud/sludge material may be buried onsite after the material has dried.
 - d. The pit material must be covered with a minimum of 3' of soil.
3. The reclamation effort will be evaluated as successful if the previously disturbed area is stabilized, all potential water erosion is effectively controlled and the vegetative stand is established with at least a 70% cover when compared to similar adjacent undisturbed areas.
4. The fluids and mud must be dry in the reserve pit before backfilling and recontouring the pit area. The operator must remediate any subsidence areas that develop from closing a pit. The plastic pit liner (if any) must be cut off below grade and properly disposed of at a state authorized landfill before beginning to recontour the site.
5. Areas of surface disturbance must be ripped or scarified to a depth of at least 12 inches before recontouring and redistributing topsoil. The rippers must not be set more than 24 inches apart.
6. Topsoil must be distributed evenly over the entire recontoured area. Prepare the seedbed by disking to a depth of 4-to-6 inches following the contour. Seed must be drilled on the contour to a depth of one-half inch, followed by cultivation to compact the seedbed, preventing soil and seed losses
7. Any mulch used for reclamation must to be certified weed free and crimped into the soil.
8. Slopes too steep for machinery may be seeded by hand broadcast with twice the amount of specified seed and raked.
9. Complete fall seeding after September 15 and prior to prolonged ground frost. To be effective, complete spring seeding after the frost has left the ground and prior to May 15.
10. Waterbars must be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to ensure drainage and extended into established vegetation. All waterbars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial waterbar should be constructed at the top of the backslope. Subsequent waterbars should follow the following general spacing guidelines:

Slope (percent)	Spacing Interval (feet)
< 2	200
2 – 4	100
4 – 5	75
> 5	50

11. BLM will not release the bond until all disturbed areas associated with the APD/POD have been successfully revegetated (evaluation will be made after the second complete growing season) and has met all other reclamation goals of the surface owner and surface management agency.

12. For bond release approval, a Final Abandonment Notice (with a surface owner release letter on split-estate) must be submitted prior to a final abandonment evaluation by BLM.
13. Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.
14. The abandonment marker must exhibit the same information required for the well sign. The abandonment marker must be installed when the wells are plugged and consist of a steel plate welded to surface casing 4 feet below ground level.

Right-of-Way Stipulations

1. Except rights-of-way expressly authorizing a road after construction of the facility is completed, the holder must not use the right-of-way as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder.
2. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land must be immediately reported to the Authorized Officer. Holder must suspend all operations in the immediate areas of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery must be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder would be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the Authorized Officer after consulting with the holder.
3. The holder must comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) must comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, *et seq.*) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (see 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 must be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances must be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.
4. The holder must conduct all activities associated with the construction, operation and termination of the right-of-way within the authorized limits of the right-of-way.
5. No construction or routine maintenance activities may be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of 2-3 inches deep, the soil is deemed too wet to adequately support construction equipment.
6. The holder is responsible for weed control on disturbed areas within the limits of the right-of-way. The holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations)
7. The holder must seed all disturbed areas, using an agreed upon method suitable for the location. Seeding must be repeated if a satisfactory stand is not obtained as determined by the authorized officer upon evaluation after the following growing season. The holder must seed all disturbed areas

with the seed mixture(s) listed below. The seed mixture(s) must be planted in the amounts specified in pounds of pure live seed (PLS)/acre. There must be no primary or secondary noxious weed seed in the seed mixture. Seed must be tested and the viability testing of seed must be done in accordance with State law(s) and within six months prior to purchase. Commercial seed must be either certified or registered seed. The seed mixture container must be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed must be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture must be evenly and uniformly planted over the disturbed area. Smaller/heavier seeds have a tendency to drop to the bottom of the drill and are planted first. The holder must take appropriate measures to ensure this does not occur. Where drilling is not possible, seed may be broadcast and the area raked or chained to cover the seed. When broadcasting the seed, the pounds per acre noted below are to be doubled. The seeding must be repeated until a satisfactory stand is established as determined by the Authorized Officer. Evaluation of growth will not be made before completion of the second growing season after seeding. The Authorized Officer is to be notified a minimum of seven days prior to seeding of the project.

ROW Seed Mixture (Silty or Clayey Ecological Sites)

The combination must include at least four of the following species. Western wheatgrass must be included in the mix. Thickspike wheatgrass may be substituted for wheatgrass only when western wheatgrass is unavailable.

<i>Species of Seed</i>	<i>(Variety)</i>	<i>Common Name</i>	<i>Pounds/acre *(PLS)</i>
<u>Pascopyrum smithii</u>	(Rosanna)	Western wheatgrass	3.00
<u>Pseudoroegneria spicata</u>	(Goldar)	Bluebunch wheatgrass	2.00
<u>Stipa viridula</u>	(Lodom)	Green needlegrass	2.00
<u>Elymus trachycaulus</u>	(Pryor)	Slender wheatgrass	2.00
<u>Stipa comata</u>		Needleandthread	1.00
<u>Bouteloua curtipendula</u>		Sideoats Grama	2.00
<u>Schizachyrium scoparium</u>		Little bluestem	2.00

**Pure Live Seed (PLS) formula: % of purity of seed mixture times % germination of seed mixture = portion of seed mixture that is PLS.*

8. Holder must remove only the minimum amount of vegetation necessary for the construction of structures and facilities. Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation.
9. The grant is issued subject to the holder's compliance with the mitigations set forth in the application and plan of development.
10. Prior to any discharge, hydrostatic testing water must be tested and processed, if necessary, to ensure that the water meets local, State or Federal water quality standards. Prior to discharge of hydrostatic testing water from the pipeline, the holder must design and install a suitable energy dissipater at the outlets and design and install suitable channel protection structures necessary to ensure that there will be no erosion or scouring of natural channels within the affected watershed as a result of such discharge. The holder will be held responsible for any erosion or scouring resulting from such discharge. Sandbags, rock, or other materials or objects installed must be removed from the site upon completion of hydrostatic testing.

11. During conditions of extreme fire danger, operations must be limited or suspended in specific areas, or additional measures may be required by the Authorized Officer.

2.4 Relevant Cumulative Actions

The Montana Statewide Final Oil and Gas Environmental Impact Statement and Proposed Amendment of the Powder River and Billings RMPs which was approved on April 30, 2003, (MT EIS) (BLM, 2003) analyzed the long-term cumulative effects of CBNG activity throughout the region in combination with other reasonably foreseeable future activities. This planning level analysis was based on the best information available at the time using predictions on the level of CBNG development. The analysis disclosed the general types of impacts to be considered in more detail during the review of site-specific CBNG proposals such as Fidelity's POD.

While there are many past, present and reasonably foreseeable actions occurring throughout the area, not all are relevant to the cumulative impacts assessment for the Fidelity POD. The actions are considered relevant if they have the potential to create impacts overlapping in time and locale, with those impacts that would occur from the proposed action or alternatives, thus resulting in cumulative impacts. In order to assess the potential for cumulative impacts from Fidelity's proposed POD, the following past, present and reasonably foreseeable future actions have been identified. The actions are considered relevant if they have the potential to contribute to cumulative impacts to one or more of the resource issues analyzed under the proposed action or alternatives. Impacts from the cumulative actions are presented in chapter 4 for each alternative.

2.4.1 Relevant Past Actions

Decker Coal Mine

The Decker Mine is a surface coal mine owned jointly by the Kiewit Company and Kennecott Energy Company and operated by Decker Coal Company, a Kiewit subsidiary. The East Decker Mine is located approximately 1.5 miles north of the project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 11,400 surface acres. The average annual coal production is 10,000,000 short tons.

Spring Creek Coal Mine

The Spring Creek Mine is a surface coal mine owned by Kennecott and operated by Spring Creek Coal Company, a Kennecott subsidiary. The mine is located approximately 7 miles northwest of the project area. The mining method consists of open pit strip mining. Overburden and interburden are removed by draglines, shovels and trucks, front-end loaders and trucks or dozers. The permitted mine operations area is approximately 7,000 surface acres. The average annual coal production is 11,000,000 million short tons.

2.4.2 Relevant Present Actions

CX Field

The CX Field is a CBNG producing field approved by MBOGC and operated by Fidelity Exploration & Production Company, a subsidiary of MDU Resources. The field encompasses approximately 56 sections between the Montana/Wyoming state line and the Decker and Spring Creek coal mines. The existing CBNG producing wells are located immediately west of the project area. Approximately 6.9 MCF of CBNG was produced from 235 wells during 2003 in the CX Field.

Gravel Pits

Fidelity operates two gravel pits to provide surfacing material for access roads, well sites and battery sites in the CX Field. One pit is located within the CX Field and the other pit is located approximately one mile south of the CX Field in Wyoming. Both pits are located on top of hills away from stream drainages.

Wyoming CBNG

Approximately 900 CBNG wells have been completed in an area of the Tongue River Watershed immediately south of the CX Field. This area includes the Wyoming portions of Badger Creek, Prairie Dog Creek and the Tongue River approximately 10 miles into Wyoming. The associated infrastructure to support these wells has been or is in the process of being constructed and installed. (See BLM, 2003 Powder River Basin Oil and Gas Project EIS/Amendment for assumptions).

2.4.3 Relevant Reasonably Foreseeable Actions

CX Field

Additional wells could be drilled and produced within the CX Field. MBOGC has established well spacing rules for the field which allow for four wells per coal seam per 160 acres, with the exception of Sections 26 and 35, T. 9 S., R. 40 E., which allows for 16 wells per coal seam per 640 acres.

CX Field (Dry Creek Proposal)

Fidelity has submitted a proposal to MBOGC, but not to BLM, for the drilling and producing of an additional 36 CBNG wells and the constructing and installing of the associated infrastructure in an area of the CX Field. This proposed project area is immediately west of existing production in the field and approximately 6 miles west of the project area. The proposal shows 22 federal wells, 11 state wells and 3 private wells could be drilled on 15 well sites with 1 to 4 wells drilled on each site.

Powder River Gas (Coal Creek Project)

Powder River Gas Company has submitted a proposal to BLM and MBOGC for the drilling and testing of 16 CBNG wells. This proposed project area is approximately 9 miles north of the project area. The proposal shows 8 federal wells would be drilled on 4 well sites and 8 private wells would be drilled on 4 well sites.

Yates Petroleum (Exploration Project)

Yates Petroleum has submitted applications to BLM for the drilling and testing of 14 wildcat CBNG wells scattered across an area from 10 to 15 miles north of the project area. The proposal shows 1 well would be drilled at each well site.

Wyoming CBNG

CBNG exploration and development is predicted to continue in the Wyoming portion of the Tongue River watershed as well as in other parts of the Powder River Basin (BLM, 2003 Powder River Basin Oil and Gas Project EIS/Amendment, Appendix A). The Wyoming Oil and Gas Commission received about 570 drilling permit applications by mid January, 2004 for the Tongue River watershed considered in this analysis.

2.5 Preferred Alternative Identification

The BLM has identified *Alternative C, Fidelity's Proposed Plan of Development with Additional Mitigating Measures*, as its Preferred Alternative.

2.6 Comparison of Alternatives

Table 2.6-1 compares the major components of the three alternatives. Table 2.6-2 compares the major impacts identified in Chapter 4 from each of the alternatives

Table 2.6-1. Badger Hills Plan of Development--Comparison of Alternatives

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
<i>Well Drilling Activities:</i>			
Number and land status of CBNG wells	0 Federal wells 20 State wells 72 Private wells	86 Federal wells 20 State wells 72 Private wells	86 Federal wells 20 State wells 72 Private wells
Wells per drill site	20 State wells drilled from 4 sites with 5 wells per site. 72 Private wells drilled from 18 sites with up to 5 wells per site. Well pad not required for most sites.	85 Federal wells drilled from 18 sites with up to 5 wells per site. 1 previous well placed on production. Same as Alternative A for 20 State and 72 Private wells. Well pad not required for most sites	Same as Alternative B with the following measures: <ul style="list-style-type: none"> Dust control measures with 50% control efficiency would be required during construction activity.
Drill hole construction	92 wells drilled by truck mounted drilling rigs to depths from 100 to 1,000 feet. Air and fresh water (including coal seam water) would be used in drilling, supplemented as needed by bentonite and sawdust or wood chips. Steel casing would be cemented in place from ground surface to the top of the target coal seam. The casing would be sized to accommodate a downhole pump to lift water, but would typically be seven inches in diameter. The well would then be drilled to the base of the target coal and under reamed to increase the exposed coal surface for production.	178 wells would be drilled in the same manner as described under Alternative A.	<ul style="list-style-type: none"> 178 wells would be drilled in the same manner as described in Alternative A with the following measures. A diverter would be installed to control uphole pressures and a minimum of three centralizers would be installed on the production casing spaced to protect shallow coals and aquifers. Specific measures would be required to keep wildlife and livestock out of reserve pits.

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Disposal of drilling wastes	Drill cuttings, water and drilling muds would be placed in two pits approximately 6'W by 15'L by 15'D and fenced with a wire fence to keep out livestock and wildlife. After conclusion of drilling operations, fluids in the pits would be removed and either used for other drilling operations or disposed in an approved manner and the pits backfilled after the mud is dried. Wastes accumulated during drilling and completion operations would be contained on the well site and disposed at the Sheridan sanitary landfill. Chemical "porta-potties" used at active construction, drilling and battery sites.	Same as Alternative A.	Same as Alternative A with the following measures: <ul style="list-style-type: none"> • Reserve pits would be lined if permeable subsurface material is encountered during construction of the pit. • Only drilling mud, cuttings, rigwash and excess cement and certain completion and stimulation fluids would be permitted in reserve pits during drilling or closure.
Access:			
Road construction and maintenance	<p>Access would use existing bladed roads, plus 14 miles of two track trails or across undisturbed rangeland following pipeline corridors with temporary roads.</p> <p>Culverts installed at drainage crossings where needed.</p> <p>Gravel or scoria needed for surfacing would come from operators private pit permitted by the MDEQ.</p> <p>Approximately 3.4 miles of existing roads would be upgraded to all weather conditions.</p>	<p>Access would use existing bladed roads, plus 22 miles of two track trails or across undisturbed rangeland following pipeline corridors with temporary roads.</p> <p>Culverts installed at drainage crossings where needed</p> <p>Gravel or scoria needed for surfacing would come from operators private pit permitted by the MDEQ.</p> <p>Approximately 4.4 miles of existing roads would be upgraded to all weather conditions.</p>	Same as Alternative B with the following measures: <ul style="list-style-type: none"> • No construction of the BLM Right of Way during periods when soils are too wet to support construction equipment. • Dust control measures with 50% control efficiency would be required during construction activity.

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Access road use	Operator to post speed limits on access roads adjacent to mountain plover habitat and sage grouse leks and brood-rearing areas.	Estimated use of access is 4 vehicles per day during drilling, 2 vehicles per day during testing and 1 vehicle per week during production (early) and 1 vehicle per month (after first 4 months). Operator to post speed limits on access roads adjacent to mountain plover habitat and sage grouse leks and brood-rearing areas.	<ul style="list-style-type: none"> Speed limit established and enforced by operator would be required to achieve at least a 65% reduction in dust emissions from a base speed of 40 mph. Dust control measures would be required on active access roads that are unpaved.
<i>Production Support Facilities:</i>			
Support Facility Corridors	Construct 9 miles of combined gas/water and two track roads.	Construct 17 miles of combined gas/water and two track roads and one mile of 8 to 12 inch steel gas line.	<ul style="list-style-type: none"> Construct 17 miles of combined gas/water and two track roads and one mile of 8 to 12 inch steel gas line.
Gas Flowlines	Buried plastic flowline to carry gas from each well of the 92 wells to the battery site. Multiple flowlines placed in same trench. Trenches would parallel roads to extent feasible.	Buried plastic flowline to carry gas from each well of the 178 wells to the battery site. Multiple flowlines placed in same trench. Trenches would parallel roads to extent feasible.	<ul style="list-style-type: none"> Buried plastic flowline to carry gas from each well of the 178 wells to the battery site. Multiple flowlines placed in same trench. Trenches would parallel roads to extent feasible. Pipelines would not change or block natural drainage courses, would not run parallel to drainage bottoms and would only cross perpendicular to drainages.

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Field Battery (compressor) sites	<p>One existing field battery (Conner 33 Battery) would be used to process gas from private wells.</p> <p>Three new field battery sites would each be constructed on approximately 2 acres and enclosed with barbed wire fence.</p> <p>One or two meter houses and up to two compressors would be located at the Montana State 36 Battery (state surface and minerals at battery site) and up to three compressors at the Seven Brothers 35 and Consol 27 Batteries (private surface and minerals at battery site). Waukesha F18 GL 400 hp compressor units are planned for all field batteries (up to 6 meter houses and 8 compressors new compressors).</p> <p>Meter houses and compressor buildings would be painted to blend with the surrounding landscape.</p>	<p>One existing field battery (Conner 33 Battery) would be used to process gas from private wells.</p> <p>Four new field battery sites would each be constructed on approximately 2 acres and enclosed with barbed wire fence.</p> <p>One or two meter houses and up to two compressors would be located at the Montana State 36 Battery (state surface and minerals at battery site) and Visborg 25 Battery and up to three compressors at the Seven Brothers 35 and Consol 27 Batteries (private surface and minerals at battery site). Waukesha F18 GL 400 hp compressor units are planned for all field batteries (up to 6 meter houses and 10 new compressors).</p> <p>Meter houses and compressor buildings would be painted to blend with the surrounding landscape.</p>	<p>Same as Alternative B with the following measures:</p> <ul style="list-style-type: none"> • Dust control measures with 50% control efficiency would be required during construction activity. • Dust control measures would be required on active battery sites.
Sales Battery (compressor) sites	One, Symons Central Compressor Station (private surface and minerals at battery site).	Same as Alternative A.	Same as Alternative A (MDEQ air quality permit requires dust control provisions).

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Powerlines	<p>Electricity would be brought into the project area from existing lines to the north and south.</p> <p>5.5 miles of aerial powerlines would be installed parallel to an access road or follow the most direct route to a subsection of the project area.</p> <p>8 miles of buried electrical cables would tie into the aerial power lines at a service tap which typically would serve up to three wells.</p> <p>Electricity would be provided to each battery site by a buried cable or an aerial line.</p>	<p>Electricity would be brought into the project area from existing lines to the north and south.</p> <p>8 miles of aerial powerlines would be installed parallel to an access road or follow the most direct route to a subsection of the project area</p> <p>Plus, aerial power lines would be constructed to comply with the avian standards mitigation measures prescribed in the MT EIS.</p> <p>13.5 miles of buried electrical cables would tie into the aerial power lines at a service tap which typically would serve up to three wells.</p>	Same as Alternative B.
<i>Produced Water Management:</i>			
Flowlines	<p>Produced water would be transported through buried plastic flowlines from each well site to: a) 4 discharge points along the Tongue River, b) 2 off-channel, total containment stock water reservoirs, c) 2 off-channel, total containment storage reservoirs for irrigation, or d) coal mines. 9 miles of these flowlines would be constructed within corridors also used for natural gas pipelines and along two track roads. An additional 3.5 miles of water pipeline are outside corridors.</p>	<p>Produced water would be transported through buried plastic flowlines from each well site to: a) 4 discharge points along the Tongue River, b) 2 off-channel, total containment stock water reservoirs, c) 2 off-channel, total containment storage reservoirs for irrigation, or d) coal mines. 17 miles of these flowlines would be constructed within corridors also used for natural gas pipelines and along two track roads. An additional 3.5 miles of water pipeline are outside corridors.</p>	<p>Same as Alternative B with the following measures:</p> <ul style="list-style-type: none"> Pipelines would not change or block natural drainage courses, would not run parallel to drainage bottoms and would only cross perpendicular to drainages.

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Impoundments	<p>Three new reservoirs would be built in natural depressions to hold produced water. One existing reservoir would also be utilized.</p> <p>The reservoir dams would be constructed of clay soil compacted in lifts.</p> <p>Low permeability clay placed in the bottom and sides of each reservoir.</p> <p>An emergency spillway constructed to pass the 100-year, 24-hour storm event would be constructed adjacent to each dam.</p>	Same as Alternative A.	<p>Same as Alternative A with the following mitigation measures:</p> <ul style="list-style-type: none"> • 2 monitoring wells will be installed adjacent to each impoundment. • The effluent limitations and monitoring requirements contained section I. B in the DRAFT MDEQ General Discharge Permit will apply.
Irrigation/Land Application	<p>Some of the produced water would be used to irrigate native vegetation in the valley bottom near Badger Creek and on a plateau above Badger Creek.</p> <p>Irrigation would be conducted under a contract with the surface owner and accomplished by either center pivot or solid set irrigation systems.</p> <p>Agricultural amendments would be added to either the soil or produced water as a result of analysis.</p>	Same as Alternative A.	<p>Same as Alternative A with the following mitigation measures:</p> <ul style="list-style-type: none"> • Monitoring wells would be installed adjacent to the irrigation areas to assess impacts to groundwater or the potential for formation of seeps. • Managed irrigation sites would be monitored and impacts addressed after produced water irrigation ceases until surface owner approved productivity levels have been established.

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
MPDES Discharge of Produced Water	<p>Total Discharge to the Tongue River from the CX Field and Badger Hills Project will be 1,600 gpm for 3 months.</p> <p>The Badger Hills Project will use four outfall points along the Tongue River. Discharge points will be located near main channel in areas with low gradients. Each outfall structure will consist of a riprap pad surrounding the pipe with a narrow riprap lined trench sloping into the channel area.</p>	Same as Alternative A, except that the duration of the 1,600 gpm discharge to the Tongue will be 17 months.	Same as Alternative B
Reclamation:			
Measures	Disturbed areas would be recontoured, stored topsoil applied over the area, erosion controls installed and the disturbed area seeded with a certified seed mix agreed to with the surface owner.	Same as Alternative A.	<p>Same as Alternative A with the following measures.</p> <p>Reclamation would require:</p> <ul style="list-style-type: none"> • Updated plans at the time of closure • Reserve pit closure standards • Seedbed preparation standards • Soil testing or treatment • Establishment of vegetation success standards • Erosion control measures • Seed mixtures for the BLM Right of Way <p>Bond release standards, including involvement of private surface owners</p>

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Timeframes	Reclamation would take place within 1 year where specific surface disturbing activities have been completed and concurrent with other operations in the project area. Final reclamation would be completed approximately 2 to 3 years following the end of gas production.	Same as Alternative A.	Same as Alternative A with the following measures: <ul style="list-style-type: none"> • Fall seeding would occur after September 15 and prior to prolonged ground frost. Spring seeding would occur after the frost has left the ground and before May 15. • BLM evaluation of reclamation success would be made after the second complete growing season.
<i>Monitoring Plans:</i>			
Air Quality	Per MDEQ Requirements for testing to demonstrate compliance with emission limits and Annual Emission Inventories.	Same as Alternative A.	Same as Alternative A.
Wildlife	None required	Monitoring of specific wildlife species is required in WMPP including: Big game crucial winter range Prairie dog towns and suitable mountain plover habitat Raptor nest productivity (including bald eagle) Bald eagle winter roosts Sage and sharptail grouse lek attendance	Same as Alternative B with the following measure: <ul style="list-style-type: none"> • Fidelity employees and subcontractors would be prohibited from possessing firearms on the project.
Soils/LAD	See Appendix 2 for summary including: Applied water quality and quantity Applied soils response to irrigation Vegetation response Off site impacts	Same as Alternative A.	Same as Alternative A.

Project Component	Alternative A—No BLM Approval (No Action, State and private land development only)	Alternative B—Fidelity Proposed POD (State & private actions plus BLM approval)	Alternative C—Proposed POD with added Mitigation Measures
Water Quality/Seepage	Per MDEQ MPDES Requirements	Same as Alternative A.	<p>Same as Alternative A with the following requirements:</p> <ul style="list-style-type: none"> Monitoring wells will also be required adjacent to impoundments and irrigation areas. The Effluent limitations and monitoring requirements of section I.B of the MDEQ DRAFT General Discharge Permit will apply. Would require POD reference wells and sampling according to MDEQ MPDES criteria.

Table 2.6-2. Badger Hills Plan of Development—Summary Comparison of Impacts

Affected Resource & Impact Indicators	Existing Resource Conditions	Alternative A—No BLM Approval (No Action)	Alternative B—Fidelity Proposed POD	Alternative C—Proposed POD with added Mitigation Measures
<i>Air Quality:</i>				
Pollutant concentrations	Existing criteria pollutant concentrations are in compliance with MAAQS and NAAQS, except for one violation of the 24 hour PM ₁₀ MAAQS in 2003 near Lama Deer in Rosebud County, Montana.	Impacts to criteria pollutant concentrations would be slightly less than Alternative B concentrations because 2 400 hp compressors and the station would not be built, and overall construction and development activities would be reduced.	Concentrations of NO ₂ , CO, SO ₂ and PM ₁₀ in compliance with MAAQS and NAAQS. Concentrations of NO ₂ in compliance with PSD Class I at the Northern Cheyenne Reservation and in adjacent PSD Class II areas.	Same as Alternative B, except PM ₁₀ concentrations would be slightly less.
Visibility	Visibility monitoring data for Northern Cheyenne Reservation are not yet available. Recent visibility monitoring data for Yellowstone National Park show no worsening trend.	Impacts to visibility would be slightly less than Alternative B because 2 400 hp compressors and the station would not be built, and overall construction and development activities would be reduced.	Visibility in compliance with thresholds for mandatory federal Class I areas. Potential exceedances of voluntary visibility threshold at other sensitive locations from cumulative sources.	Same as Alternative B, except visibility impairment would be slightly less.
Atmospheric Deposition	Existing atmospheric deposition monitoring at Little Big Horn Battlefield National Monument shows precipitation pH values are normal.	Impacts to atmospheric deposition would be slightly less than Alternative B because 2 400 hp compressors and the station would not be built, and overall construction and development activities would be reduced.	Atmospheric deposition in compliance with voluntary lake chemistry threshold in sensitive lakes.	Same as Alternative B.
<i>Cultural Resources:</i>				

Affected Resource & Impact Indicators	Existing Resource Conditions	Alternative A—No BLM Approval (No Action)	Alternative B—Fidelity Proposed POD	Alternative C—Proposed POD with added Mitigation Measures
National Register listed or eligible sites	2 Sites on Private Surface/Minerals – Site has been Determined Eligible, No sites listed on National Register 1 Site in POD and 1 Site in adjacent section to be developed	Same as existing resource conditions.	Same as existing resource conditions and Alternative A.	Same as existing resource conditions. <ul style="list-style-type: none"> Two sites would require verification by BLM to determine if they would be impacted.
<i>Social and Economic Conditions:</i>				
Amount of natural gas production in area	9.7 MMCF FY 2002	50% increase from FY 2001	30% increase from Alternative A	Same as Alternative B
Traffic levels on Northern Cheyenne Reservation	See the Northern Cheyenne Narrative Report, 2002	No increase	No increase	No increase
Springs and wells as domestic or agricultural water sources	Produce acceptable quality and quantity of water for well or spring owner	Water Well Mitigation Agreement required by MBOGC Order 99-99	Water Well Mitigation Agreement required by MBOGC Order 99-99, and BLM	Same as Alternative B
Noise levels for area residents	From existing sources	Compressors would be located at least 1 mile from occupied dwelling	Same as Alternative A	Same as Alternative A
Environmental Justice Concerns	Impacting activities must meet NCT air and water quality standards, and do not impose hardships on NCT services	NCT air and water quality standards would be met through permitted activities NCT services not required to support proposed CBNG development	Same as Alternative A	Same as Alternative A
Notify landowner before permit issued	As per MBOGC or BLM or operator protocol	As per MBOGC requirements or operator protocol	As per MBOGC or BLM requirements and operator protocol	Same as Alternative B

Affected Resource & Impact Indicators	Existing Resource Conditions	Alternative A—No BLM Approval (No Action)	Alternative B—Fidelity Proposed POD	Alternative C—Proposed POD with added Mitigation Measures
Northern Cheyenne	NCT does not provide employees, services or equipment to CX Field	Employees, field services, equipment would come from Sheridan, WY	Same as Alternative A	Same as Alternative A
<i>Soils and Vegetation:</i>				
Acres of Disturbance	0	199 acres	297 acres	297 acres
Area of LAD	0	152 acres	152 acres	152 acres
Soil/Vegetative productivity in LAD areas	1,400 lbs./acre Based on Ecological site descriptions, (not actual data)	2,400 lbs./acre during irrigation 1,050 lbs./acre post-irrigation	2,400 lbs./acre during irrigation 1,050 lbs./acre post-irrigation	2,400 lbs./acre during irrigation 1,050 lbs./acre post-irrigation
Soil/Vegetative productivity on roads	800 lbs./acre for two-track roads 1400 lbs./acre undisturbed lands	100 lbs./acre for two-track roads 0 lbs./acre on improved roads	100 lbs./acre for two-track roads 0 lbs./acre on improved roads	100 lbs./acre for two-track roads 0 lbs./acre on improved roads
<i>Water Quality Cumulative Impacts:</i>				
Max LMM SAR at Birney Day School	1.02	1.32	1.32	1.32
Max LMM EC at Birney Day School (mS/cm)	717	735	735	735
Duration of 1600 gpm discharge to Tongue	0 month	3 months	17 months	17 months
Groundwater Under Impoundment sites	unaltered	unaltered	unaltered	unaltered
<i>Water Quantity Direct Impacts:</i>				
Radius of Badger Hills Project 20' Drawdown Contour	N/A	3.1 miles	3.6 miles	3.6 miles

Affected Resource & Impact Indicators	Existing Resource Conditions	Alternative A—No BLM Approval (No Action)	Alternative B—Fidelity Proposed POD	Alternative C—Proposed POD with added Mitigation Measures
Area Contained within the 20' Drawdown Contour (Square Miles)	0	87	105	105
# of Domestic/Stock Wells within the POD 20' Drawdown Contour	36 1 spring	41	45	45
# of Springs within the POD 20' Drawdown Contour	1	1	1	1
<i>Water Quantity Cumulative Impacts:</i>				
Max. groundwater production rate	984 gpm	2,257	3,476	3,476
Max discharge rate to Tongue River	984	1,600	1,600	1,600
Duration of 1600 gpm discharge to Tongue	0 month	3 months	17 months	17 months
Max LMM Flow at Birney Day School (cfs)	179	184	184	184
Radius of Badger Hills Project 20' Drawdown Contour	none	3.1 miles	3.6 miles	3.6 miles
# of Domestic/Stock Wells in the Cumulative 20' Drawdown Area	72	89	90	90
# of Springs in the Cumulative 20' Drawdown Area	12	27	27	27
<i>Wildlife:</i>				

Affected Resource & Impact Indicators	Existing Resource Conditions	Alternative A—No BLM Approval (No Action)	Alternative B—Fidelity Proposed POD	Alternative C—Proposed POD with added Mitigation Measures
Habitat fragmentation in project area	Project area is fragmented by state highway, county gravel road and railroad. Large blocks of undisturbed habitat within project area	Increased habitat fragmentation with the addition of landscape-level CBNG development affecting about 1/2 presently undisturbed habitat. Partitioning of landscape with new structures include 22 well sites, 14 miles of pipeline corridors, 3.4 miles of improved roads, 9 miles of two track roads, 3 batteries and 5.5 miles of aerial powerlines	Fragmentation affects about 2/3 presently undisturbed habitat with 40 well sites, 22 miles pipeline corridors, 4.4 miles improved roads, 17 miles of two track roads, 4 batteries and 8 miles of aerial pipelines	Same as Alternative B.
Vehicle traffic-wildlife collisions	Direct mortalities are common related to state highway and railroad traffic	Increased mortalities related to increased roads and traffic.	Same as Alternative A.	Same as Alternative A.
Electrocution hazard level	Existing Aerial powerlines pose electrocution hazard	Increased electrocution hazard with addition of 5.5 miles of new powerlines with construction in high raptor use corridor (i.e., Tongue River valley and near active nest sites)	Increased electrocution hazard with addition of 8 miles of new powerlines with construction in high raptor use corridor (i.e. Tongue River Valley and near active nest sites).	Same as Alternative B.
Proximity to T&E species habitat	Light disturbance to bald eagle nesting and winter roost habitat.	Increased disturbance to bald eagle nesting and winter roost habitat with addition of CBNG infrastructure and human presence to what was previously low impact and/or acclimated to by bald eagles	Same as Alternative A Increase in CBNG infrastructure	Same as Alternative B.